

## CLAIMS

1. An electrode device comprising:
  - a cup-like support integrally including a cup part defining a recess and an outer flange surrounding an outer periphery of said cup part over a circumference thereof; and
  - a sheet-like support integrally including an inner part having an area corresponding to said cup-like part and an outer part surrounding an outer periphery of said inner part over a circumference thereof,

said cup-like support and said sheet-like support being designed such that said outer flange and said outer part are superimposed with each other in such a manner as to be surface contacted with each other, thereby defining a chamber for receiving a medicine holding layer containing an electrolyte at said cup part that is located on an inner side, one of said cup-like support and said sheet-like support being provided with an electrode layer extending from inside said chamber to outside said chamber,

said electrode device having the following respective features;

  - A. at least a place, where said electrode layer is formed, of the superimposing part between said outer flange of said cup-like support and the outer part of said sheet-like support is in a non-joined state, and
  - B. at least one of said outer flange and said outer part which are superimposed with each other is provided with a leakage prevention means in order to prevent a liquid, which flows out of said medicine holding layer loaded in said chamber, from leaking through a gap occurrable at said place in said non-joined state.
2. An electrode device according to claim 1, wherein said liquid leakage prevention means is a shape deformation part disposed at least at one of said mutually superimposed outer flange and outer part and the gap between said mutually superimposing parts is more enlarged than that between the rest parts by said shape deformation part, thereby eliminating the leakage attributable to said liquid.
3. An electrode device according to claim 2, wherein said shape deformation part is located on the side of said cup-like support including said cup part.

4. An electrode device according to claim 3, wherein said shape deformation part is a ring-like groove formed in said outer flange and a depth direction of said groove is same as that of said recess of said cup part.
5. An electrode device according to claim 4, wherein the depth  $d$  of said groove satisfies  $0.1 \text{ mm} \leq d \leq \text{depth of said recess}$ .
6. An electrode device according to claim 1, wherein said liquid leakage prevention means specifies surface characteristics of the respective surfaces of the mutually confronting places of said outer flange of said cup-like support and said outer part of said sheet-like support, and a contact angle with water is set to be 90 degrees or higher.
7. An electrode device according to claim 6, wherein the respective surfaces of said mutually confronting surfaces of said outer flange of said cup-like support and said outer part of said sheet-like support are each provided with a surface coating layer containing a water repellent material.
8. An electrode device according to claim 1, wherein said liquid leakage prevention means is composed of a combination of two mutually different means and comprises first means which is said shape deformation part disposed at least at one of said outer flange and said outer part which are superimposed with each other, a gap between said superimposing parts being more enlarged than that between the rest parts by said shape deformation part so that leakage attributable to said liquid can be eliminated, and second means specifying the surface characteristics of the respective surfaces of the mutually confronting places of said outer flange of said cup-like support and said outer part of said sheet-like support, in which the contact angle with water is set to be 90 degrees or higher.
9. An electrode device according to claim 1, wherein said sheet-like support is a plastic sheet material whose surface is matted, said electrode layer is supported by the matted surface of said plastic sheet material, a gel, that is said medicine holding layer, is placed on said electrode layer and an outer peripheral part of said gel is placed on the surface of said matted plastic sheet material.
10. A method of using an electrode device comprising a cup-like support integrally including a cup part defining a recess and an outer flange surrounding an outer periphery

of said cup part over a circumference thereof; and a sheet-like support integrally including an inner part having an area corresponding to said cup-like part and an outer part surrounding an outer periphery of said inner part over a circumference thereof,

said cup-like support and said sheet-like support being designed such that said outer flange and said outer part are superimposed with each other in such a manner as to be surface contacted with each other, thereby defining a chamber for receiving a medicine holding layer containing an electrolyte at said cup part that is located on an inner side, one of said cup-like support and said sheet-like support being provided with an electrode layer extending from inside said chamber to outside said chamber,

said electrode device having the following respective features;

- A. at least a place, where said electrode layer is formed, of the superimposing part between said outer flange of said cup-like support and the outer part of said sheet-like support is in a non-joined state, and
- B. at least one of said outer flange and said outer part which are superimposed with each other is provided with a leakage prevention means in order to prevent a liquid, which flows out of said medicine holding layer loaded in said chamber, from leaking through a gap occurrable at said place in said non-joined state,

said method comprising, at the time of using said electrode device, filling a gel as said medicine holding layer in said chamber and then said gel is crosslinked to more enhance the shape retainability than before said gel is filled in said chamber and thereafter removing said cup-like support from the side of said sheet-like support while remaining said gel on the side of said sheet-like support.